5:00

INFANTILE CONGESTIVE CARDIOMYOPATHY: RELATION OF OUTCOME TO LV FUNCTION, HEMODYNAMICS AND HISTOLOGY.

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Although survival after congestive cardiomyopathy (CCM) is better in infants than older patients, specific factors which determine outcome are poorly defined. We retrospectively evaluated potential predictors of outcome in infants (<2 yrs) with CCM from 1982-89. We excluded patients with structural or ischemic heart disease, storage disease, or after exposure to cardiotoxic agents (doxorubicin). All available clinical and laboratory data were reviewed. We identified 24 patients with a mean age of presentation of 0.4y. There were 7 deaths (29%) with all but 1 occurring less than 2 months after presentation. In the 17 survivors followed for 0.6-7y, LV dysfunction (LV ejection fraction <47%) was found in 4, 2 of whom are symptomatic. The remaining 13 have normal LV function and no symptoms.

Survival correlated significantly with LV function and LV shape (long axis:short axis ratio) at the time of presentation with a more spherical shape increasing the risk of death. Afterload adjusted velocity of shortening (a load independent index of contractility) also correlated with late contractility and function. Histology was available in 20/24 (16 biopsy, 4 necropsy) early after presentation (mean 3.5 weeks).

Pathology	EFE	Carditis	MIT	Nonspecific	None
Total	6	8	1	5	4
Dead	4	2	1	0	0
↓LV Function	1	1		2	0

MIT = mitochondrial defect, EFE = endocardial fibroelastosis

EFE was significantly related to poor outcome. Of the 4 patients without biopsy, 2 had clinical evidence of myocarditis based on CPK levels and isolation of Coxsackie B virus from stool. Mortality in the 11 subjects with histologic (6), serologic (1) or clinical evidence of myocarditis (2) was 18%, 4 of whom were treated with immunoactive drugs and did well. Hemodynamic data obtained in 19 patients (filling pressures, pulmonary artery pressure and cardiac index) did not correlate with outcome. LV thrombus was detected in 2/24 (9%) and no embolic events were recognized. Ventricular tachycardia occurred only in 3 subjects with myocarditis.

1) Most infants with CCM have a favorable outcome (>70% survive, 60% recover completely). Those who die do so early in the course of the disease. 2) Severity of LV dysfunction, globular LV shape, and EFE on biopsy worsen the prognosis. 3) Myocardial biopsy is useful for diagnosis and prognosis.

5:15

LYMPHOCYTE GROWTH FROM ENDOMYOCARDIAL BIOPSIES IN PEDIATRIC HEART ALLOGRAFTS

Frederick J. Fricker, Christina L. Kaufman, Suzanne B. Taylor, Adrianna Zeevi, Rene J. Duquesnoy, John M. Armitage, Elfriede Pahl. Children's Hosp and Univ of Pittsburgh, PA.

The histological and functional characteristics of lymphocyte infiltrates on endomyocardial biopsies (EMB) were determined in 17 pediatric heart transplant recipients. All patients were maintained on CYLA/steroid/AZA immunosuppression. Protocol EMB were evaluated histologically and graded according to the extent and location of mononuclear infiltrate and presence of myocyte necrosis. 129 of these biopsies were cultured in media containing interleukin-2, and irradiated autologous feeder cells. Based on the fact that only activated T cells can expand in the presence of interleukin 2 alone, we correlated presence of lymphocyte growth with histological grade of EMB. Grade 0-1 biopsies showed 20-30% growth and grade 2-3 biopsies showed 60-80% growth. In 15 cases of rejection, where a biopsy was cultured within 6 weeks prior to the rejection episode, 10 of the biopsies showed lymphocyte growth. In conclusion the frequency of lymphocyte growth from pediatric EMB correlates with the grade of the biopsy and increases the sensitivity of the EMB in the diagnosis of rejection. There is predictive value between lymphocyte growth and subsequent episodes of clinical rejection.

Tuesday, March 5, 1991
4:00PM–5:30PM, Room 360, West Concourse
Echocardiographic Assessment of Ischemic, Infarcted, and Stunned Myocardium

4:00

REGIONAL LEFT VENTRICULAR FUNCTION, RATHER THAN DEFECT DENSITY, PREDICTS FIXED 24 HOUR THALLIUM-201 DEFECTS

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Stress thallium-201 (SPECT) defects may undergo redistribution in ischemic, though viable, myocardium either at 4 hours (4 HR RED) or at 24 hours (24 HR RED) post-stress. However, detection of 24 HR RED requires a second costly hospital visit. The purpose of our study was to investigate whether the severity of a 4 hour SPECT defect, assessed by count density, or regional function, assessed by echocardiographic (ECHO) wall motion, could optimally predict which 4 hour SPECT defects would remain fixed at 24 hours. In 41 patients with stable angina pectoris, we graded SPECT and ECHO using a 16 segment model of the left ventricle. SPECT defects were graded as mild, moderate or severe: ECHO wall motion as normal, hypokinetic or akinetic/dyskinetic (AK/DYS). In the 532 gradable segments the results were:

		Thallium Scintigraphy		
Echo Wall Motion	Normal	4 HR RED	24 HR RED	Fixed Defect
Normal	178	25	32	23
Hypokinetic	69	17	31	96
AK/DYS	6	3	5	47 $p < 0.0001$

ECHO wall motion predicted fixed 24 hour defects in the 234 segments with any SPECT defect at 4 hours. In these segments, the likelihood (positive predictive value) that an AK/DYS segment would remain fixed at 24 hours was 90.3% (47/52), and a hypokinetic segment, 75.6% (96/127). These values were similar regardless of the severity of the SPECT defect at 4 hours (p=NS). Furthermore, in the presence of normal wall motion, 18/24 (75%) of severe SPECT defects and 22/23 (96%) of moderate defects showed 24 HR RED.

In conclusion, the likelihood that a 4 hour SPECT defect will remain fixed at 24 hours is predicted by consideration of regional function of the involved segment, not by the severity of the SPECT defect.

4:15

QUANTITATIVE ULTRASONIC ASSESSMENT OF NORMAL, STUNNED AND INFARCTED MYOCARDIUM WITH AN ACOUSTIC MICROSCOPE.

William O'Brien, Kiran Sagar, Lorie Pelc, Theodore Rhyne, David Warltier, University of Illinois, Urbana, IL.

Identification of viable but stunned myocardium remains a major problem. Since stunned myocardium results in impairment of myocardial function without any structural damage and infarcted myocardium causes major structural disruption, we postulated that acoustic properties can distinguish the two insults. Studies were performed in anesthetised open chest dogs. Normal (circumflex region), stunned (15 min occlusion followed by 3 hr reperfusion of left anterior descending coronary artery (LAD) n=6) and infarcted (90 min occlusion followed by 3 hr reperfusion of LAD, n=8) regions of myocardium were quantitatively evaluated with the scanning laser acoustic microscope, operating at 100MHz. Three ultrasonic quantities were determined: attenuation coefficient (AT), an index of loss per unit distance, propagation speed and a spatial variation of speed called the heterogeneity index (HI). Normal myocardium's AT (17.6±2.0 dB/mm) was 29% ($P \leq 0.01$) greater than that of stunned (13.6±1.0 dB/mm) and 28% greater than that of ischemic (13.8±1.8 dB/mm) myocardium. Propagation speed of normal (1592±10 m/s) was 0.5% lower than that of stunned (1600±9 m/s) and was 1.1% higher than that of ischemic (1575±11m/s) myocardium. The HI, an index which is related to the ultrasonic backscattering strength, showed a marked increase of 56% between normal (4.8 m/s) and stunned (7.5 m/s) myocardium. However, for the ischemic myocardium the HI is essentially the same as that of normal myocardium. Myocardial water content was increased in stunned (78.5±2%) and infarcted myocardium (78.7±1.2%) as compared to the normal (78.0±2%). We concluds that acoustic properties are able to identify stunned myocardium despite relative normal myocardial structure.